

REMARKS

Claim 19 has been canceled, and Claims 4, 17 and 18 has been amended. Claims 1-18 and 20-24 are present in the application. Reconsideration of the application, as amended, is respectfully requested.

Election of Species and Generic Claims

With reference to the election of species requirement, the first paragraph on page 2 of the Office Action asserts that "there are no generic claims in the instant application". The Office Action goes on to indicate that a claim which reads on two or more species may or may not be "generic". However, the Office Action provides no analysis to support the assertion that the claims in the instant application are not generic. In the context of an election of species situation, it is customary to refer to a claim which reads on two or more species as a "generic" claim, and Applicants have used the word "generic" in that customary context. In any event, the Office Action appears to agree that the present application includes claims which read onto more than one of the identified species, which is the basic point that Applicants were making.

Depiction of Claimed Features in the Drawings

In paragraph 2, the Office Action raises an objection to the drawings under 37 C.F.R. §1.83(a), asserting that the drawings fail to show every feature recited in the claims. This ground of objection is respectfully traversed. More specifically, the Office Action asserts that the drawings do not disclose a longitudinal axis of a passageway, as recited in each of Claims 2 and 4. However, examples of

longitudinal axes of passageways are indicated by broken lines at 66 in Figure 5, 108 in Figure 9, 208 in Figure 10, 308 in Figure 11, and 453 in Figure 12. The Office Action also asserts that the drawings fail to show the fluid supply device which is recited in Claim 13. However, an example of a fluid supply device is shown at 51 in Figure 3. This latter objection appears to be related to an objection to the specification which is set forth in paragraph 6 of the Office Action, and which is discussed below.

Antecedent Relationship Between Claims and Specification

More specifically, paragraph 6 objects to the specification under 37 C.F.R. §1.75(d)(1) and MPEP §608.01(o), asserting that there is no antecedent basis in the specification for the use in Claim 13 of the term "a fluid supply device". This ground of objection is respectfully traversed. In this regard, the attention of the Examiner is respectfully directed to MPEP §2173.05(e), which deals with antecedent basis for claim terminology in the specification, and which states that: "There is no requirement that the words in the claim must match those used in the specification disclosure". Applicants respectfully submit that a person skilled in the art would readily recognize that the "fluid supply device" recited in Claim 13 corresponds to and is supported by the cooling system 51 disclosed in the specification and drawings. (Of course, the fact that the cooling system 51 supports this limitation in Claim 13 is pointed out by way of example, and is not intended to suggest any limitation to the breadth of that claim language).

Depiction in Drawings of Features Discussed in Specification

In paragraph 3, the Office Action raises a further objection to the drawings under 37 C.F.R. §1.83(a), asserting that they fail to show the cooling loop 52 as initially being of a round cross section, which is then compressed to form an oval (as described at lines 2-19 on page 14 of the specification). The Office Action makes a vague assertion that this detail is essential to a proper understanding of the invention, but gives no specific reason why this detail would be essential to a proper understanding of the invention, and Applicants respectfully submit that it is not.

More specifically, in the embodiment discussed at the indicated portion of the specification, the round cross section is not actually a structural detail of the embodiment itself, because the assembled embodiment has loops with an oval cross section rather than a round cross section. The specification is merely discussing one possible technique for fabricating such a loop of oval cross section, by taking a part of round cross section and then deforming it. It is respectfully submitted that persons skilled in the art will readily understand from the indicated portion of the specification how a tubular part of round cross section can be deformed to have an oval cross section, without any need to show a round cross section in the drawing. Moreover, persons skilled in the art will readily recognize that the disclosed loop of oval cross section could alternatively be formed in some other suitable and known manner, for example by extruding it with an initial cross section which is oval rather than round.

For these reasons, it is respectfully submitted that the subject matter discussed in the indicated portion of the specification would be readily and clearly understood by

persons skilled in the art, without any need for a separate drawing showing an intermediate stage of fabrication which is not in any way essential to an understanding of the particular embodiment of the invention which is being discussed at this point in the specification. It is therefore respectfully requested that this drawing objection be withdrawn.

Abstract

In paragraph 5, the Office Action raised objections to the Abstract. First, the Office Action asserted that, in the first sentence of the Abstract, the word "includes" should be changed to "including". This objection is respectfully traversed. Given the structure of that sentence, the correct verb tense is "includes" rather than "including", and the proposed change would render the sentence grammatically incorrect. Applicants have therefore not made the proposed change.

The second objection to the abstract indicates that the words "turbulence inducing" should be inserted before "structures" in line 10, for improved clarity. This objection is respectfully traversed. Line 10 refers to "the" structures, and the only structures discussed anywhere in the Abstract are the turbulence inducing structures. Consequently, this part of the Abstract is already clear, and the proposed addition of the words "turbulence inducing" would not provide any increased clarity.

Claim Language

In paragraph 7, the Office Action raises an objection to several claims, on the ground that they each include an informality. One such objection indicated that Claim 4 includes an occurrence of "a" which should be changed

to "an". The foregoing amendment to Claim 4 effects this correction.

Another such objection noted that Claims 6, 23 and 24 each include the phrase "a plurality of portions which each induce turbulence", and asserted that the word "induce" should be "induces". This objection is respectfully traversed. Applicants are enclosing an excerpt from "The Concise Handbook for Technical Writing" by Charles T. Brusaw, St. Martin's Press, New York, 1996 (two title pages and page 277). Page 277 points out that where "each" appears after a plural subject with which it is apposition, "each" should be followed with the plural form of the verb in question. In the present application, Claims 6, 23 and 24 each have a plural subject (i.e. plural "portions"). Therefore, each of the indicated claims is grammatically correct in using after the word "each" the plural verb form "induce", rather than the singular verb form "induces".

Still another objection asserted that the word "a" should be inserted before "turbulence" at specified locations in each of Claims 1 and 22. This ground of objection is respectfully traversed. The phrase "turbulence inducing structure" in each of these claims is an intentionally broad term, which encompasses not only a single turbulence inducing part, but also multiple turbulence inducing parts. The addition of the word "a" could incorrectly suggest that the "turbulence inducing structure" covers a single part but not multiple parts. Therefore, and since this portion of Claims 1 and 22 is consistent with customary claim-writing practice, the suggested change has not been implemented.

Still another objection indicated that the comma should be deleted between "apparatus" and "comprising" in line 1 of Claim 17. This ground of objection is respectfully

traversed. No similar objection was raised regarding comparable language in line 1 of Claim 1. Moreover, the use of a comma at this point is routinely accepted by the PTO, as evident from the independent claims in each of U.S. Patent Nos. 5,111,280, 5,833,450, 5,835,345, 5,829,516, and 4,332,294 (each of which is already of record in the present application).

Compliance of Claims with Second Paragraph of 35 USC §112

In paragraph 9 on pages 4-7, the Office Action rejects Claims 1, 2, 4-10 and 13-24 as indefinite under the second paragraph of 35 U.S.C. §112, for enumerated reasons. Each of these rejections is discussed separately below.

On page 4, the Office Action indicates that Claim 1 is indefinite because of the phrase "in a manner selected to achieve a predetermined temperature profile along said passageway in material of said part adjacent to said fluid passageway, in response to fluid flow through said fluid passageway". The Office Action asserts that it is not clear which particular structure corresponds to this limitation. The Office Action also rejects each of Claims 19 and 22 on a similar ground. (Please note that the limitations from Claim 19 now all appear in Claim 17, and the following discussion therefore refers to Claim 17 rather than Claim 19). Each of these rejections is respectfully traversed. More specifically, each such rejection ignores the fact that the indicated language is part of a definition of the recited "turbulence inducing structure", and it is respectfully submitted that the specification and drawings clearly identify which disclosed structure is operable to induce turbulence, and also clearly link this structure to the goal of achieving a predetermined temperature profile. (For example, see the

text at lines 17-20 on page 9, at lines 3-9 on page 13, and in the paragraph bridging pages 14-15. Of course, this portion of the specification is identified merely by way of example, and is not intended to suggest any limitation to the relatively broad language used in each of Claims 1, 17 and 22). Applicants wish to add that, just because claim language is broad does not automatically mean that it is indefinite. In this regard, the attention of the Examiner is respectfully directed to MPEP §2173.04, the title of which emphasizes that "Breadth Is Not Indefiniteness". This section of the MPEP states that: "Breadth of a claim is not to be equated with indefiniteness". The indicated portions of Claims 1, 17 and 22 are admittedly broad, but it is respectfully submitted that they are not indefinite, and that they are each in full compliance with §112.

In the paragraph bridging pages 4-5, the Office Action rejects Claim 8 on the ground that it is not clear what is meant by the recitation that the "cold plate includes aluminum silicon carbide", asserting that language of this type is not clear as to whether the plate is made entirely of aluminum silicon carbide or contains only a speck of this material. This paragraph applies a similar rejection to language in Claim 10. These grounds of rejection are respectfully traversed. In this regard, the attention of the Examiner is respectfully directed to Romero U.S. Patent No. 5,666,269, which is of record in the present application. Dependent Claims 4 and 5 of the Romero patent respectively recite that "the isolation layer comprises aluminum oxide" and "the isolation layer comprises epoxy". Neither of these two claims specifies whether the isolation layer is made entirely of aluminum oxide or epoxy, or whether it contains only a speck of the indicated material. It is thus respectfully

submitted that Claim 8 of the present application conforms to a form of claim writing practice which is customarily accepted by the PTO, as evidenced by the Romero patent, and that Claim 8 of the present application is thus properly definite under the second paragraph of §112.

On page 5, the Office Action rejects Claim 14 on the ground that "said fluid" has no proper antecedent basis, because the fluid in question was previously recited functionally rather than positively. A similar rejection is imposed with respect to the phrase "said temperature profile" in Claim 16. These grounds of rejection are respectfully traversed. In the context of Claim 14, the phrase "the fluid" would be regarded as equivalent to "said fluid", and thus the Office Action is apparently suggesting that "said fluid" should be replaced with "a fluid". But this would present a serious problem of antecedent basis in Claim 14, because it would not be clear that the claim is specifically referring to the same fluid referred to earlier, even if the previous recitation was functional rather than positive. Further, the attention of the Examiner is respectfully directed to Claim 13 of Chu U.S. Patent No. 5,269,372, which is of record in the present application, and which includes a reference to "said fluid" (line 17 of column 10), even though this fluid was previously recited functionally rather than positively in Claim 10 (line 48 of column 19). Therefore, with respect to the present application, it is respectfully submitted that the phrase "said fluid" in Claim 14 and the phrase "said temperature profile" in Claim 16 conform to claim-writing practice which is accepted by the PTO, that these phrases are therefore not indefinite, and that these phrases are thus each in compliance with §112.

On page 5, the Office Action rejects Claim 15 on the ground that there is indefiniteness in the phrase "further comprising a phased array antenna system which includes said part, said structure, and said electronic components". This rejection is respectfully traversed. The Office Action first asserts that it is not clear what structure (if any) the phased array antenna system includes in addition to the "part", the "structure", and the "electronic components". Applicants respectfully submit that, having properly and positively recited the phased array antenna system, there is no requirement that the claim also recite structural details of this antenna system. The Office Action also asks whether the previously-recited "part", "structure" and "electronic components" are being recited a second time (thus creating a problem known as "double inclusion"). It is respectfully submitted that these elements are not being recited twice. More specifically, since Claim 15 makes it clear that the part, the structure and the electronic components within the antenna system are the same as the previously-recited part, structure and electronic components, Claim 15 is reciting these elements only once rather than twice. Claim 15 was intentionally drafted this way in order to avoid any double inclusion problem. For the foregoing reasons, it is respectfully submitted that Claim 15 is not indefinite, and that Claim 15 is in compliance with §112.

On page 5, the Office Action rejects Claim 16 on the ground that the word "approximately" is a relative term which renders the claim indefinite. The Office Action then makes the vague and conclusory statement that the word "approximately" is not defined by the claim, that the specification does not provide a standard for ascertaining the requisite degree, and that one of ordinary skill in the art

would not be reasonably apprised of the scope of the invention. This ground of rejection is respectfully traversed. The attention of the Examiner is directed to MPEP §2173.05(b), which indicates that use of a relative term does not automatically render a claim indefinite. Further, the attention of Examiner is respectfully directed to Romero U.S. Patent No. 5,915,463, which is of record. Claim 1 of the Romero '463 patent recites that "first and second fin structures are approximately the same height". It is noted that this claim does not define the term "approximately", nor does the patent specification appear to provide a standard for "ascertaining the requisite degree". Nevertheless, the use of "approximately" in Claim 1 of Romero was accepted by the PTO as definite under §112. There are a number of other claims in the patents of record which also use the word "approximately", and which were accepted by the PTO as properly definite. For example, the attention of the Examiner is respectfully directed to Claims 7, 8, 11, 13, 16, 18 and 19 of the Romero '463 patent, Claim 5 of U.S. Patent No. 4,366,497, Claim 6 of U.S. Patent No. 5,375,654, Claims 1 and 13-15 of U.S. Patent No. 5,839,505, and Claim 3 of U.S. Patent No. 5,573,062. It is thus respectfully submitted that the term "approximately" as used in Claim 16 of the present application conforms to customary PTO practice and is properly definite, and that Claim 16 is thus in compliance with §112. Notice to that effect is respectfully requested.

In the paragraph bridging page 5-6, the Office Acton rejects Claim 17 as indefinite on the ground that it is not clear whether the word "therein" refers to the "flat plate" or the "apparatus". This ground of rejection is respectfully traversed. Claim 17 has been carefully reviewed, and it is respectfully submitted that a person of ordinary skill in the

art would readily understand that the word "therein" is referring to the "flat plate" and not the "apparatus". The word "therein" appears in a clause of Claim 17 which is set forth as a separate subparagraph. Grammatically, it is clear that the term "therein" is referring to something in the same clause/subparagraph within which it appears, and this clause/subparagraph refers only to the "flat plate" and not the "apparatus". Replacing the word "therein" with several words referring to the flat plate would merely increase the complexity of Claim 17, without increasing its clarity. For these reasons, it is respectfully submitted that the word "therein" in Claim 17 is entirely definite and that Claim 17 complies with §112, and notice to that effect is respectfully requested.

On page 6, the Office Action rejects Claim 18 as indefinite, indicating the phrase "adjacent structures" presents a problem of antecedent basis with respect to whether or not this is intended to be a reference to the same turbulence inducing structures which were previously recited. Claim 18 has been amended to clearly reflect the antecedent relationship between this limitation and the previously-recited turbulence inducing structures. It is respectfully submitted that this amendment eliminates in Claim 18 the indicated problem of indefiniteness under §112.

On page 6, the Office Action also rejects Claim 18 on the ground that the limitation "vary along said passageway" is indefinite. Claim 5 is rejected on the basis of similar language therein. In explaining these rejections, the Office Action indicates that it is not clear whether the longitudinal distances are different in length, or whether these distances vary in length over time. Applicants respectfully submit that there is no such unclarity. The specification and drawings of

the present application contain nothing which suggest that the relevant distances vary over time, and it is respectfully submitted that persons skilled in the art would readily understand what is meant by the recitation in the claims that specified distances vary along the passageway. Accordingly it is respectfully submitted that the indicated language does not present any problem of indefiniteness, and is respectfully submitted that this language is in compliance with §112.

On page 6, the Office Action rejects Claim 20 on the ground that the word "inward" is a relative term which renders the claim indefinite. This ground of rejection is respectfully traversed. MPEP §2173.05(b) addresses the extent to which a relative term may be indefinite, and points out that: "Acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification". Claim 20 of the present application refers to "an annular inward protrusion", and it is respectfully submitted that persons skilled in the art would readily understand what is meant by this claim language, including the intended meaning of the term "inward", even without reference to the specification. It is therefore respectfully submitted that Claim 20 is fully definite under §112, and notice to that effect is respectfully requested.

In the last paragraph on page 6, the Office Action rejects Claim 22 on the ground that the limitation "along material of a thermally conductive part adjacent a fluid passageway formed within said part" is indefinite because it is not clear as written. This ground of rejection is respectfully traversed. The assertion in the Office Action that this language is not clear as written is a conclusory assertion, and the Office Action provides no explanation of why this limitation might be considered to be unclear.

Applicants have carefully reviewed this limitation from Claim 22, and it is respectfully submitted that it is grammatically correct and that its intended meaning is clear. Applicants believe that persons skilled in the art will readily understand what the limitation in Claim 22 is reciting. It is therefore respectfully submitted that this limitation in Claim 22 is entirely definite, and complies with §112.

In the first paragraph on page 7, the Office Action rejects Claim 23 on the ground that the limitation "which each induce turbulence" is indefinite because it is not clear what the word "which" refers to. Claims 5, 6 and 24 are rejected for the same basic reason. These grounds of rejection are each respectfully traversed. For example, in Claim 23, grammatical rules require that the phrase "with each" must necessarily be modifying some sort of plural language, and the only plural limitation that precedes "which each" in Claim 23 is the recitation of plural "portions". The same is true for Claims 5, 6 and 24. Accordingly, it is respectfully submitted that the indicated language in each of Claims 5, 6, 23 and 24 is properly definite, and notice to that effect is respectfully requested.

Differences Between the Claims and the Cited Art

Turning to the merits, independent Claims 1 and 17 have each have been rejected under 35 U.S.C. §102 on the ground that they are anticipated by any one of Schubert U.S. Patent No. 6,299,657, Staskus U.S. Patent No. 5,835,345, Clyde U.S. Patent No. 4,222,434, Smith UK Publication No. 2,159,265, or VEB Inducal German Patent No. 240,986. Independent Claim 22 stands rejected under §102 as anticipated by any one of the Smith, Clyde and VEB Inducal patents. These grounds of

rejection are respectfully traversed, for the following reasons.

Schubert, Staskus, Clyde, Smith and VEB Inducal each disclose an arrangement which is intended to maximize the amount of heat transferred from some physical structure to a fluid which flows through that structure. In contrast, the focus of the present invention does not inherently involve maximization of the amount of heat transferred. Instead, the present invention is intended to achieve a predetermined temperature profile within material along a passageway, by appropriate configuration of turbulence inducing structure within the passageway. That is, in order to achieve the predetermined temperature profile, the turbulence inducing structure is not configured specifically to maximize heat transfer, but instead to transfer heat in a manner which produces temperatures within the material along the passageway that conform to the predetermined temperature profile.

As one example of such a temperature profile, see lines 17-20 on page 9 of the present application, which discuss an isothermal temperature profile, where the material adjacent the passageway has approximately the same temperature along the length of the passageway. This means that turbulence inducing structure must be carefully configured to provide appropriate heat transfer rates along the passageway that maintain approximately the same temperature in the material along the length of the passageway. (This isothermal temperature profile is mentioned here only by way of example, and is not intended to suggest any limitation to the scope of the broad language of the claims, which encompass a wide variety of temperature profiles).

Although the Schubert, Staskus, Clyde, Smith and VEB Inducal references each disclose passageways with turbulence

inducing structure, the turbulence inducing structure is apparently configured to maximize heat transfer rates, and none of these references appear to teach turbulence inducing structure which has been intentionally configured to achieve heat transfer rates that produce a predetermined temperature profile within the material along the passageway. Accordingly, it is respectfully submitted that these references not only fail to anticipate a distinctive feature of the invention which is expressly recited in each of independent Claims 1, 17 and 22, but that this feature would not be obvious in view of any of these references. It is therefore respectfully submitted that Claims 1, 17 and 22 are each patentably distinct from each of Schubert, Staskus, Clyde, Smith and VEB Inducal, and notice to that effect is respectfully requested.

Dependent Claims

Claims 2-16, Claims 18 and 20-21, and Claims 23-24 respectively depend from Claim 1, Claim 17 and Claim 22, and are also believed to be patentable over the art of record, for example for the same reasons discussed above with respect to Claims 1, 17 and 22.

Conclusion

Based on the foregoing, it is respectfully submitted that all of the pending claims are fully allowable, and favorable reconsideration of this application is therefore respectfully requested. If the Examiner believes that examination of the present application may be advanced in any way by a telephone conference, the Examiner is invited to telephone the undersigned attorney at (214) 953-6684.

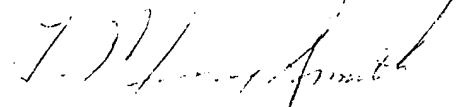
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Although Applicants believe that no additional fees are due, the Commissioner is hereby authorized to charge any fees required by this paper, or to credit any overpayment, to Deposit Account No. 02-0384 of Baker Botts L.L.P.

Respectfully submitted,
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Enclosures: Marked-up Version of Claims 4, 17 and 18,
 showing amendments
 Excerpt from "The Concise Handbook for
 Technical Writing" (3 sheets)
 Post Card

MARKED-UP VERSION OF CLAIMS 4, 17 and 18

4. (Amended) An apparatus according to Claim 1, wherein said structure includes [a] an inwardly projecting annular protrusion formed along a perimeter of said passageway in a plane approximately perpendicular to a longitudinal axis of said passageway.

17. (Amended) An apparatus, comprising:
a thermally conductive flat plate having a fluid passageway formed therein; and
a plurality of turbulence inducing structures disposed along said fluid passageway, wherein locations of said structures are selected to achieve a predetermined temperature profile along said passageway in material of said plate adjacent to said fluid passageway, in response to fluid flow through said fluid passageway.

18. (Amended) An apparatus according to Claim 17, wherein said structures are longitudinally spaced from each other along said passageway [from adjacent said structures], and longitudinal distances between adjacent said structures vary along said passageway .

The Concise Handbook for Technical Writing

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Different than is acceptable when it is followed by a clause.

EXAMPLE The job cost was *different than* we had estimated it.

each

When *each* is used as a subject, it takes a singular verb or pronoun.

TECHNOLOGY CENTER R3700

EXAMPLE *Each* of the reports is to be submitted ten weeks after it is assigned.

When *each* occurs after a plural subject with which it is in apposition, it takes a plural verb or pronoun.

EXAMPLE The reports *each have* white embossed titles on *their* covers.

e.g./i.e.

The abbreviation *e.g.* stands for the Latin *exempli gratia*, meaning "for example"; *i.e.* stands for the Latin *id est*, meaning "that is." Since perfectly good English expressions exist for the same uses (*for example* and *that is*), there is no need to use a Latin expression or abbreviation except in notes and illustrations where you need to save space.

CHANGE Some terms of the contract (*e.g.*, duration and job classification) were settled in the first two bargaining sessions.

TO Some terms of the contract (*for example*, duration and job classification) were settled in the first two bargaining sessions.

CHANGE We were a fairly heterogeneous group; *i.e.*, there were managers, foremen, and vice-presidents at the meeting.

TO We were a fairly heterogeneous group; *that is*, there were managers, foremen, and vice-presidents at the meeting.

If you must use *i.e.* or *e.g.*, punctuate them as follows. If *i.e.* or *e.g.* connects two independent clauses, a semicolon should precede it and a comma should follow it. If *i.e.* or *e.g.* connects a noun and appositive, a comma should precede and follow it.

EXAMPLES We were a fairly heterogeneous group, *i.e.*, managers, foremen, and vice-presidents.

We were a fairly heterogeneous group; *i.e.*, we were managers, foremen, and vice-presidents.

etc.

Etc. is an abbreviation for the Latin *et cetera*, meaning "and others" or "and so forth"; therefore, *etc.* should not be used with *and*.